REMARKS

The foregoing amendment amends claims 1, 4, 5, 7, 9, 10 and 12 and adds new independent claim 14. Pending in the application are claims 1, 2, 4, 5, 7-10, 12 and 14, of which claims 1, 4, 7, 10, 12 and 14 are independent. The following comments address all stated grounds of rejection and place the presently pending claims, as identified above, in condition for allowance. The Applicants respectfully urge the Examiner to pass the claims to allowance in view of the remarks set forth below.

Claims 5, 7 and 9 have been amended to address certain informalities noted by the Examiner.

Independent claims 1, 4, 7, 10 and 12 have been amended to specify that the operation condition of the fuel cell is detected by a detecting means for detecting at least one of a current value or voltage value from the fuel cell. *No new matter is added.*

Amendment and cancellation of the claims are not to be construed as an acquiescence to any of the objections/rejections set forth in the instant Office Action, and were done solely to expedite prosecution of the application. Applicants reserve the right to pursue the claims as originally filed, or similar claims, in this or one or more subsequent patent applications.

Claim Objections

Claims 5, 7 and 9 are objected to for certain informalities. Applicants have amended claims 5 and 9 to change the phrase "flow rate control unit" to ---temperature control unit---, as suggested by the Examiner. Applicants also amend claim 7 to remove the term [and]. Applicants have addressed the informalities cited by the Examiner and respectfully request that the objections be withdrawn.

Art Rejections-Claims 1-4, 7, 8 and 10-13

Applicants thank the Examiner for the close review of the claims and for withdrawing the final rejection in view of the Amendment filed on December 26, 2002.

Pending claims 1, 2, 4, 5, 7-10 and 12 are newly rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Application Publication No. 11-40180 (the '180 publication) in view of Japanese Application Publication No.10-92455 (the '455 publication).

Applicants respectfully traverse this rejection and submit that pending claims 1, 2, 4, 5, 7-10 and 12 are not obvious in view of the combination of the '180 publication and the '455 publication.

The present invention is directed to a fuel cell system and method in which the amount of water recovered from a gas/liquid separator changes depending on an operating condition of the fuel cell. Based on the recovered water amount, the flow rate and temperature of the cooling medium supplied to the gas/liquid separator is controlled. In particular, the claimed invention recites that the operation condition of the fuel cell is detected by detecting means for detecting one of a current value or voltage value from the fuel cell. Therefore, in the present invention, the cooling medium flow rate and temperature are controlled in accordance with an operating condition of the fuel cell, and, representatively, by an increase or decrease in the electrical output of the fuel cell.

For example, as noted in the second full paragraph on page 10 of the present application, in explaining the first embodiment of the invention, it is noted that to be possible to postulate the amount of recovered condensed water by the electrical output of the fuel cell. The present invention advantageously suppresses unnecessary electrical consumption during recovery of discharged water in a fuel cell system, thereby providing economic and efficient operation of the fuel cell.

The cited references do not teach or suggest controlling a cooling medium flow rate and/or a temperature of a cooling medium for a gas/liquid separation apparatus, by detecting an output current value and/or voltage value of the fuel cell, as recited in independent claims 1, 4, 7, 10 and 12. The cited references do not so much as teach or suggest *any* sensor structure for detecting a voltage amount or a current amount of a fuel cell and therefore are incapable of controlling a parameter of a cooling medium based on an output current value and/or voltage value of the fuel cell. It follows, therefore, that the cited references do not teach or suggest any of the above-mentioned innovative knowledge and advantages of the present invention.

The '180 publication describes a fuel cell system having a first cell-cooling water system 2 including a first heat exchanger 3 connected to a fuel cell. A secondary cooling water system 4 is connected to the first heat exchanger 3 and includes a second heat

exchanger 8, a pump 5, a first and second control valve 6 and 11, a temperature detecting means 7, a cooling tower 9 and a bypass line 10. A supply water line 18 including a cutoff valve 19 merges with an exhausting passage of the second heat exchanger 8. Depending on a level of water in a water tank, a control device 20 controls the cutoff valve 19 and the control valve 6. The cutoff valve 19 provides additional water to the water tank and the control valve 6 controls the flow of secondary circulating water through the heat exchanger.

The '180 publication does not teach or suggest a detecting means for measuring a current value or a voltage value of a fuel cell to determine an operation condition of the fuel cell, as recited in independent claims 1, 4, 7, 10 and 12. The '180 publication also does not teach or suggest controlling a cooling medium flow rate or temperature depending on an amount of water separated from discharge components using a separator, which in turn depends on an operation condition of the fuel cell. The '180 publication also describes controlling valves 6 and 19 based on a level of water in a water tank, which is not necessarily indicative of the amount of water from the heat exchanger. As recognized by the Examiner, the '180 publication also does not describe that the pump and fan are also controlled on the basis of information detected by a detecting means.

The '455 publication does not compensate for the deficiencies of the '180 reference. The '455 publication describes a system for recovering produced water from a fuel cell. The system includes a heat exchanger 3, a flow regulating valve, a thermometer a temperature setter and a temperature regulator. Based on the temperature of the exhaust gas from the fuel cell, a flow regulating valve controls the flow of cooling water to the heat exchanger to control the temperature of the heat exchanger. The '455 publication also does not teach or suggest a detecting means for measuring a current value or a voltage value of a fuel cell to determine an operation condition of the fuel cell, as recited in claims 1, 4, 7, 10, 12 and 14. The '455 reference also does not teach or suggest varying an amount of said water produced by separating discharge components from a gas/liquid separator depending on an operation condition of said fuel cell, as recited in claims 1, 4, 7, 10 and 12.

The '455 publication also does not teach or suggest controlling a temperature of a *cooling medium* provided to a liquid/air separator, as recited in claims 4 and 12. Rather, the '455 publication describes measuring and controlling the temperature of the exhaust gas from the fuel cell.

As described above, the cited references, alone or in combination, fail to teach or suggest the subject matter of the claimed invention. Therefore, the claims are not obvious over the cited prior art.

New Claim

Newly added claim 14 is directed to a gas/liquid separation method comprising the steps of setting a discharge gas outlet temperature of a gas/liquid separator by controlling a rotational speed of a pump supplying cooling medium to the separator and changing an amount of condensed water obtained as a result of setting the discharge gas outlet temperature. As shown in Figure 2 of the present application, as the outlet temperature of the condenser 20 increases, the amount of produced condensed water decreases. Similarly, as the temperature of the cooling water increases, the amount of condensed water also decreases. (See page 10, lines 17-21 of the present application.) The present invention, as set forth in claim 14, is based on such knowledge. More specifically, as noted in the specification and shown in Figure 2, there is a mutual relationship between the outlet temperature of the condenser 20 and the condensed water amount. Thus, by arbitrarily setting the outlet temperature of the condenser 20, the amount of condensed water obtained thereby can be varied. (See page 12, lines 2-7.)

The cited references do not teach or suggest varying an amount of condensed water obtained by a separator by setting an outlet temperature of discharge gas from a separator, wherein the discharge gas outlet temperature is controlled by controlling a rotational speed of a pump, thereby varying a flow rate of cooling medium to the separator. Therefore, Applicants respectfully submit that claim 14 is also allowable over the cited references.

In light of the arguments set forth above, the '180 publication and the '455 publication fail to teach or suggest all of the claim limitations of claims 1, 2, 4, 5, 7-10, 12 and 14. Claims 5 and 9, which depend from claim 4 and 7, respectively, are also not rendered obvious over the cited prior art. Applicants therefore request the withdrawal of the Examiner's rejection of claim 1, 2, 4, 5, 7-10-13 as being unpatentable over the '180 publication and the '455 publication.

Conclusion

In light of the aforementioned arguments, Applicants contend that each of the Examiners rejections has been adequately addressed and the pending application is in condition for allowance.

Should the Examiner feel that a telephone conference with Applicants' attorney would expedite prosecution of this application, the Examiner is urged to contact the Applicants' attorney at (617) 227-7400.

Respectfully submitted,

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